12-10. Checklists and Forms.
Not Applicable.

Chapter 13
Hand and Power Tools

13-1. References.

a. ANSI/ASSP A10.3, Safety Requirements for Powder Actuated Fastening Systems (https://webstore.ansi.org/) (13-1.a)

b. ANSI B7.1, Safety Code for the Use, Care and Protection of Abrasive Wheels (https://webstore.ansi.org/) (13-1.b)

c. ANSI/OPEI B175.1/A1, Internal Combustion Engine-Powered Hand-Held Chain Saws - Safety and Environmental Requirements (https://webstore.ansi.org/) (13-1.c)

d. ANSI O1.1, Woodworking Machinery Safety Requirements (https://webstore.ansi.org/) (13-1.d)

e. 29 CFR 1910 Subpart P, Hand and Portable Powered Tools and Other Hand-Held Equipment (https://www.govinfo.gov/content/pkg/CFR-2020-title29-vol5/pdf/CFR-2020-title29-vol5-part1910-subpartP.pdf) (13-1.e)

f. 29 CFR 1926 Subpart I, Tools-Hand and Power (https://www.govinfo.gov/content/pkg/CFR-2020-title29-vol8/pdf/CFR-2020-title29-vol8-part1926-subpartI.pdf) (13-1.f)

13-2. Definitions.

a. Authorized Instructor. One who has been trained, authorized, and provided an authorized instructor's card by the tool manufacturer or by an authorized representative of the tool manufacturer. (13-2.a)

b. Explosive-Actuated Tool. A tool that uses the expanding gases from a powder load to drive a fastener. Also referred to as a powder-actuated tool. (13-2.b)

13-3. Personnel Required Training/Qualification.

a. Before using a power tool, personnel must become familiar with the manufacturer’s operating instructions for that specific power tool. (13-3.a)

b. Explosive-Actuated Tools. Only qualified operators may operate explosive-actuated tools. A qualified operator is one who has: (13-3.b)

(1) Been trained by an authorized instructor.

(2) Possesses a qualified operator's card supplied by the manufacturer and issued and signed by both the instructor and the operator.

c. Chainsaws. Train chainsaw operators according to all manufacturer's recommendations, to include at a minimum: (13-3.c)

(1) Use of PPE according to the manufacturer's recommendations and chapter 5.

(2) Proper fueling procedures.

(3) Safe use and handling procedures.

(4) Proper cutting techniques.

(5) Procedures to avoid kickbacks.

(6) Procedures to avoid and react to binding.

13-4. Roles and Responsibilities.
Not Applicable.

13-5. Inspection Requirements.

a. General Hand and Power Tools. Inspect and test hand and power tools before each use to ensure they are in a safe operating condition according to the manufacturer's instructions. Hand and power tools must be in good repair and with all required safety devices installed and properly adjusted. Remove tools from service that have defects that could impair their strength or render them unsafe. (13-5.a)

b. Explosive-Actuated Tools (13-5.b)

(1) Perform daily inspection, cleaning, and testing as recommended by the manufacturer.

(2) Test explosive-actuated tools according to the manufacturer's recommended procedure each day before loading to see that safety devices are in proper working condition.

(3) Inspect, thoroughly clean, and test each explosive-actuated tool every 1,000 fastenings.

13-6. Activity Hazard Analysis (AHA) Requirements.
Develop AHAs according to paragraphs 1-6 or 2-6, as applicable. When using power tools that require guarding, identify the type of guarding and the inspection requirements on the AHA.

13-7. Minimum Plan Requirements.
Not Applicable.

13-8. General Requirements.

a. All hand and power tools must meet the requirements included in this paragraph. (13-8.a)

(1) Use and maintain hand and power tools according to the manufacturer's instructions and recommendations and only for the purpose for which designed. Keep a copy of the manufacturer's instructions and recommendations with the tools.

(2) Use PPE according to chapter 5 of this manual and as specified by the manufacturer.

(3) When work is being performed overhead, secure tools that are not being used or place them in holders.

(4) Do not throw tools or materials from one location to another or from one person to another or drop them to lower levels.

(5) Use only non-sparking tools when in locations where sources of ignition may cause a fire or explosion.

(6) Tools requiring heat treating or redressing must be tempered, formed, dressed, and sharpened by personnel who are experienced in these operations.

(7) Do not use cranks on hand-powered winches or hoists unless the hoists or winches are provided with positive self-locking dogs. Do not use hand wheels with exposed spokes, projecting pins, or knobs.

(8) Do not allow the use or operation of fuel-powered tools inside confined spaces, enclosed spaces, partially enclosed spaces, or buildings unless adequate ventilation is provided to ensure the equipment does not generate a hazardous atmosphere according to chapters 5, 6, and 34 of this manual.

(9) Do not wear loose and frayed clothing, loose long hair, dangling jewelry (including dangling earring, chains, and wrist watches) while working with any power tool.

(10) Guarding.

(a) Ensure guards are in place and functioning properly for all power tools designed to accommodate guards.

(b) Guard the reciprocating, rotating, and moving parts of equipment employees may come in contact with or that otherwise create a hazard.

(11) Anchor or securely clamp floor and bench-mounted power tools to a firm foundation to withstand lateral or vertical movement.

b. Hand Tools. (13-8.b)

(1) Do not use wrenches, including adjustable, pipe, end, and socket wrenches, when jaws are sprung to the point that slippage occurs.

(2) Keep impact tools, such as drift pins, wedges, and chisels, free of mushroomed heads.

(3) Keep the wooden handles of tools free of splinters or cracks and tight in the tool.

c. Electric Power-Operated Tools. (13-8.c)

(1) Power tools must be listed by a NRTL for the specific application for which they are to be used.

(2) Electric power-operated tools must either be of the approved double-insulated type or grounded according to chapter 11.

(3) GFCI protection must be provided for all outlets serving portable electric hand-tools.

(4) Do not use electric cords for hoisting or lowering tools.

(5) Provide an electrical power control on each machine or power tool to make it possible for the operator to cut off the power to the machine or power tool without leaving the point of operation.

(6) On applications where injury to the operator might result if motors were to restart after power failure, make provisions to prevent machines from automatically restarting upon restoration of power.

(7) See paragraph 13-8.h for additional requirements for electrically powered saws.

d. Pneumatic Power Tools. (13-8.d)

(1) Provide a safety lashing at connections between tool and hose and at all quick makeup type connections.

(2) Install and maintain safety clips or retainers on pneumatic impact (that is, percussion) tools to prevent attachments from being accidentally expelled.

(3) Do not exceed the manufacturer's safe operating pressure for tools, hoses, pipes, valves, filters, and other fittings.

(4) All hoses exceeding one-half (½) inch (1.3 cm) inside diameter must have a safety device at the source of supply or branch line to reduce pressure in case of hose failure.

(5) Shut off the pressure and exhaust the line before disconnecting the line from any tool or connection.

(6) Do not use hoses to hoist or lower tools.

(7) Equip airless spray guns of the type which atomize paints and fluids at high pressures (that is, 1,000 psi (6,895 kPa) or more) with an automatic or visible, manual safety device. The safety device must prevent the trigger from being pulled so that paint or fluid is not discharged until the safety device is manually released. In lieu of the above, a diffuser nut that will prevent high-pressure velocity release while the nozzle tip is removed plus a nozzle tip guard that will prevent the tip from coming into contact with the operator, or other equivalent protection may be provided.

(8) Provide impact wrenches with a locking device for retaining the socket.

(9) All pneumatic tools used on or around energized lines or equipment must have non-conducting hoses of adequate strength for the normal operating pressures.

e. Hydraulic Power Tools. (13-8.e)

(1) Use appropriate hydraulic fluid in powered tools so that it retains its operating characteristics at the most extreme temperatures to which it will be exposed. For underground use, see chapter 26.

(2) Do not exceed the manufacturers' safe operating pressures for hydraulic hoses, valves, pipes, filters, and other fittings.

(3) All hydraulic tools used on or around energized lines or equipment must have non-conducting hoses of adequate strength for the normal operating pressures.

f. Explosive-Actuated Tools. (13-8.f)

(1) Explosive-actuated (that is, powder-actuated) tools must meet the design requirements of ANSI A10.3.

(2) Provide each tool with the following:

(a) A lockable container with the words "EXPLOSIVE- ACTUATED TOOL" in plain sight on the outside and a notice reading, "WARNING – EXPLOSIVE -ACTUATED TOOL TO BE USED ONLY BY A QUALIFIED OPERATOR AND KEPT UNDER LOCK AND KEY WHEN NOT IN USE" on the inside.

(b) Operator’s instruction and service manual.

(c) Power load and fastener charts.

(d) Tool inspection record.

(e) Service tools and accessories.

(3) Secure explosive-actuated tools and the charges at all times to prevent unauthorized possession or use.

(4) Do not load explosive-actuated tools until just before the intended firing time. Do not point load nor empty tools in the direction of other persons. Keep hands clear of the open barrel end.

(5) Do not use explosive-actuated tools in explosive or flammable atmospheres.

(6) Do not drive fasteners into:

(a) Soft or easily penetrable materials, unless they are backed by a material that will prevent the fastener from passing through to the other side.

(b) Very hard or brittle material such as cast iron, hardened steel, glazed or hollow tile, glass block, brick, or rock.

(c) Concrete, unless the material thickness is at least three times the penetration of the fastener shank.

(d) Spalled concrete.

(7) If the explosive-actuated tool misfires, wait at least 30 seconds before firing again. If the tool will not fire after a second attempt, wait at least another 30 seconds before removing the faulty cartridge. Place the faulty cartridge in water until disposal. Follow the manufacturer’s instructions for appropriate disposal.

g. Grinding and Abrasive Machinery. (13-8.g)

(1) Equip all abrasive wheels and tools with safety guards and comply with other applicable requirements of ANSI B7.1.

(2) With the exception of the following, use abrasive wheels only on machines provided with safety guards.

(a) Portable abrasive wheels used for internal grinding if the wheel is entirely within the work being ground.

(b) Portable abrasive wheels used for internal grinding when wheels 2 inches (5.1 cm) or less in diameter are securely mounted on the end of a steel mandrel.

(c) Types 16, 17, 18, 18R, and 19 cones and plugs and threaded hole pot balls, where the work offers protection or where the size does not exceed 3 inches (7.6 cm) in diameter by 5 inches (12.7 cm) long.

(d) Type 1 wheels not larger than 2 inches (5 cm) in diameter and not more than one-half (½) inch (1.2 cm) thick, operated at peripheral speeds less than 1800 surface-feet per minute (ft/min) (9.1 surface-m/s) when mounted in mandrels driven by portable drills.

(e) Type 1 reinforced wheels not more than 3 inches (7.6 cm) in diameter and one-quarter (¼) inch (0.6 cm) in thickness, operating at peripheral speeds not exceeding 9500 surface-feet/min (48.3 surface-m/s) if safety glasses and face shield protection are worn.

(3) Adjust tongue guards on bench/stand grinders to within one-quarter (¼) inch (0.6 cm) of the constantly decreasing diameter of the wheel at the upper opening.

(4) Supply grinders with power sufficient to maintain the spindle speed at safe levels under all conditions of normal operation.

(5) Do not adjust work or tool rests while the grinding wheel is in motion.

(6) Position work or tool rests on power grinders within one-eighth (⅛) inch (0.3 cm) from the wheel.

(7) Closely inspect abrasive wheels and ring-test them before mounting. Destroy cracked or damaged grinding wheels.

(8) Do not operate grinding wheels in excess of their rated safe speed.

(9) Provide floor stand and bench-mounted abrasive wheels used for external grinding with safety guards (for example, protective hoods).

(a) Maintain the maximum angular exposure of the grinding wheel periphery and sides to not more than 90°, except when work requires contact with the wheel below the horizontal plane of the spindle, in which case, maintain the angular exposure to not more than 125°. In all situations, maintain the angular exposure to not more than 65° above the horizontal plane of the spindle.

(b) Safety guards must be strong enough to withstand the effect of a bursting wheel.

h. Power Saws and Woodworking Machinery. (13-8.h)

(1) Operate and maintain woodworking machinery according to ANSI O1.1.

(2) Guarding.

(a) Ensure hand-fed circular saws are equipped with guards that automatically and completely enclose the cutting edges, splitters, and anti-kickback devices.

(b) Ensure portable power-driven circular saws are equipped with guards above and below the base plate or shoe.

(b-1) The upper and lower guards must cover the saw to the depth of the teeth, except for the minimum arc required to permit the base to be tilted for bevel cuts and for the minimum arc required to allow proper retraction and contact with the work, respectively.

(b-2) When the tool is withdrawn from the work, the lower guard must automatically and instantly return to the covering position.

(c) Fully guard the blades of planers and jointers and equip them with cylindrical heads with throats in the cylinder.

(d) Fully enclose band saw blades except at the point of operation.

(3) Install automatic feeding devices on machines whenever possible. Cover or guard feed rolls and other moving parts on feeder attachments to protect the operator from hazardous points.

(4) Permanently mark the operating speed on circular saws more than 20 inches (50.8 cm) in diameter or operating at over 10,000 peripheral feet/min (50.8 peripheral m/s).

(a) Do not operate saws at a speed other than that marked on the blade.

(b) When a marked saw is re-tensioned for a different speed, correct the marking to show the new speed.

(5) Equip radial arm power saws with an automatic brake.

(6) The table of radial arm or swing saws must extend beyond the leading edge of the saw blade.

(7) Install radial arm power saws so the cutting head will return to the starting position when released by the operator. Equip all swing cutoff and radial saws or similar machines drawn across a table with limit stops to prevent the leading edge of the tool from traveling beyond the edge of the table.

(8) Each hand-fed crosscut table saw and each hand-fed circular ripsaw must have a spreader to prevent the material from squeezing the saw or being thrown back on the operator.

(9) Warm-up band saws and other machinery requiring minimum ambient temperatures for safe operation prior to using them to perform their intended operation. Warm up machinery whenever the temperature is below 45°F (7°C).

(10) Use a push-stick, block, or other safe means on all operations close to high-speed cutting edges.

(11) Do not use cracked, bent, or otherwise defective parts such as saw blades, cutters, or knives.

(12) Provide a brush for the removal of sawdust, chips, and shavings on all woodworking machinery.

(13) Do not leave power saws running unattended.

i. Chainsaws. (13-8.i)

(1) Chainsaws must have a clutch, automatic chain brake (gas only) or kickback device, throttle trigger latch, stop switch, rear hand guard, chain catcher, vibration damper, spark arrestor, and muffler, and must otherwise meet the requirements of ANSI/OPEI B175.1/A1.

(2) Gas-powered chainsaws must be equipped with a control that will return the saw to idling speed when released.

(3) Start and operate chainsaws only after all co-workers are clear and then according to the manufacturer’s instructions.

(4) Start chainsaws on the ground or where otherwise firmly supported. Do not drop start a chainsaw.

(5) Start chainsaws with the chain brake engaged.

(6) Adjust the idle speed so that the chain does not move when the engine is idling.

(7) Do not fuel chainsaws while running, while hot, or near an open flame. Do not start saws within 10 feet (3 m) of a fuel container.

(8) The operator must hold the saw with both hands during all cutting operations.

(9) Shut off the saw when carrying it over slippery surfaces, through heavy brush, and when adjacent to others. The saw may be carried running at idle speed with the brake set for short distances (less than 50 feet (15.2 m)) as long as it is carried to prevent contact with the chain or muffler.

(10) Never use a chainsaw to cut above the operators' shoulder height.

(11) Keep chainsaw chains sharp and properly adjusted according to the manufacturer's instructions.

(12) See chapter 31 for tree maintenance and removal requirements.

j. Abrasive Blasting Equipment. (13-8.j)

(1) Hose and hose connections must be designed to prevent build-up of static electricity.

(2) Connections and nozzles must be designed to prevent accidental disengagement. Equip all connections with safety lashings. (See chapter 20)

(3) Nozzle attachments must be of metal and fit on the outside of the hose. Provide a deadman-type control device at the nozzle to cut off the flow if the operator loses control of the hose. Provide a support on which the nozzle may be mounted when it is not in use.

(4) Refer to chapter 6 for additional requirements on abrasive blasting.

k. Power-Driven Nailers and Staplers. This subparagraph applies to hand-held electric, combustion, or pneumatically driven nailers, staplers, and other similar equipment (referred to as "nailers" in this subparagraph) which operate by ejecting a fastener into the material to be fastened when a trigger, lever, or other manual device is actuated. This does not apply to common spring-loaded "staple guns". (13-8.k)

(1) Nailers must have a safety device on the muzzle to prevent the tool from ejecting fasteners unless the muzzle is in contact with the work surface. Do not secure the contact trip device or trigger in an "on" position.